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VA improves solution analyzing methods

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WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Research Laboratory's Air Vehicles Directorate worked with AeroSoft, Inc. to improve methods of analyzing solutions obtained using Computational Fluid Dynamics (CFD).

The result of the Small Business Innovation Research program, a post-processing tool known as SENSE, is a complete software package for determining flow field sensitivities. Using SENSE, engineers can perform parametric studies during the vehicle design process at a fraction of the cost of traditional methods. For example, instead of having to compute multiple CFD solutions for each design parameter to be considered, the influence and relative importance of all design parameters can be determined from one CFD solution. This capability allows engineers to find important trends in the flow field and can significantly decrease the cost and turn-around time for vehicle design and optimization.

In addition to determining the influence of geometric design parameters, such as wing-thickness distribution or sweep angle, the software provides the option of studying the effects of flow parameters, for example, freestream Mach number or angle of attack. Used in this manner, SENSE can calculate measures of performance and stability derivatives, such as lift curve slope or yaw damping, for less than 10 percent of the cost required to compute an additional CFD solution. Since any parameter of the system can be used in this analysis, many other engineering problems can be addressed as well. @